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## Impact of Defense Expenditures on Economic Growth

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**Abstract:**

**Purpose:** The objective of this paper is to determine the impact that the 2% of GDP allocation on Defense expenditures has on the NATO member states that have assumed this commitment.

**Design/Methodology/Approach:** In terms of national defense industries two aspects must be taken into consideration. Employment is the first considered, as a functioning defense industry, be it through partnerships, off-set or just internal production would decrease unemployment and have a positive impact on economic growth. The second argument is that of imports and exports of armament that have increases since countries have been required not only to jump to 2% in terms of defense expenditures

**Findings:** The empirical results show that before for member states correlation exists and positive effects on imports and exports can be observed, while for non-NATO countries that are in different partnerships in terms of security and defense with the United States, there seem to be a mixture of effects on different categories of economic activities.

**Practical Implications:** It is the aim of this paper to show whether the 2% of the GDP allocation should be continued to all NATO member states that have yet to commit to this effort. So far findings indicate, that while results are not always positive, key advantages can be observed by applying this strategy, rather than not going forward with the commitment.

**Originality/value:** Investing in defense and security is an innovative approach now that the EU on its own is considering requesting special allocation on the Common Defense and Security Policy for member states. It is therefore worth analyzing if investments already requested by NATO are feasible and whether duplicating efforts might or might not appear when both NATO and EU ask member states to contribute more to defense expenditures.

**Keywords:** Procurement, defense budget, defense resources, economic growth.

**JEL codes:** C30, P35, O43.

**Paper type:** Research study

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## 1. Introduction

Defense expenditures have been studied over the years specialized literature. The correlation has been presented either for a group of states<sup>5</sup> or for individual states<sup>6</sup>. While older paper<sup>7</sup>s show that defense expenditures can have different trends, either positive or negative in terms of impact on economic growth, recent papers tend to establish through econometrical models that in most cases, the effects of defense expenditures are negative when correlated with economic growth. Conventionally it is believed that defense expenditure is inversely related to economic development due to its high opportunity cost in term of forgone productive expenditure. Endogenous growth theories suggest that government expenditure has an important impact on the long-run growth rate. Its influence depends on the size of government intervention and on the different components of public spending. Moreover, different kinds of government expenditures have heterogeneous effects on economic growth.

The same analysis that applies to the choice between military goods and civilian goods can also be applied to the choice between production for current consumption and production for future consumption. Criticism of defense expenditures has therefore created the term guns and butter, to make possible the analysis of the opportunity cost that civilian goods and military goods would bring to the table. <sup>8</sup>Defense spending cannot contribute to a nation's ability to produce more economic goods and services in the future. More public expenditure in the military sector leads to crowding out of private investment and less investment on public goods like health, education, and scientific research. Thus, from both the short-run and the long-run points of view a decline in military spending will attain the primary objective of development, that is, to benefit people. A possible beneficial effed of defense expenditure lies in its role in creating effective demand when there is slack in the economy. Within the Keynesian framework of macroeconomic analysis, government expenditure on goods and services including defense is an important force in the determination of output and employment. From this perspective, military spending or any other form of government spending has the potential of achieving full employment output.

Defense expenditures have become a subject of even more attention ever since the NATO Wales Summit in 2014. The 2014 NATO Wales Summit discussed Russia, Ukraine, Iraq, defense spending amongst allies and the end of combat operations in Afghanistan.

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<sup>5</sup>Korkmaz, *The Effect of Military Spending on Economic Growth and Unemployment in Mediterranean Countries*, 2015.

<sup>6</sup>Obreja, *The Impact of Defense Expenditure on Economic Growth*, 2010.

<sup>7</sup>Robert, Alexander, *The impact of defence spending on economic growth*, 2007.

<sup>8</sup>Amjad, *Impact of Defense Expenditure on Economic Growth: Time Series Evidence from Pakistan* *Impact of Defense Expenditure on Economic Growth: Time Series Evidence from Pakistan*, 2014.

Allies adopted a Readiness Action Plan to strengthen NATO's collective defense. Primarily geared towards the Eastern part of the Alliance, this includes plans to establish a Very High Readiness Joint Task Force that can deploy within a few days, and an enhanced military presence involving exercises and a continued military presence on a rotational basis. Following the Crimean Crisis, NATO member states came to an agreement in 2014 to increase their expenditures to 2% of the GDP. Even more, to make sure that these expenditures are directed towards deterrence and developing national defense capabilities, member states agreed in the same summit that from this 2%, a minimum of 20% of the budget would be spent on procurement of defense equipment.

These two commitments changed the perspective on defense. Some countries immediately jumped to the 2% expenditures while other refused, while making the increase in defense expenditures a long-term commitment not a short term one. A picture of how defense expenditures looked in 2017-2018 can be observed in Figure 1.

**Figure 1.** Defense Expenditures as part of GDP projections for 2017-2018.



**Source:** World Bank <https://data.worldbank.org/indicator/MS.MIL.XPND.GD.ZS>

Some countries have considered that the 2% increase might represent a problem for other economic indicators and therefore have postponed this increase in expenditures. Although the 2% benchmark may serve as a simple indication of political commitment and alliance solidarity, there are a few reasons not to be satisfied with this metric. For one thing, it does not work well in comparison. A dollar spent on defense in Europe does not go as far as it might in other cases, so purchasing-power difference also must be considered when making comparisons with a country like China.

Another point of difference is to do with the scope of strategic commitments – unlike Americans, Europeans do not maintain a far-flung network of bases supporting a global alliances system.

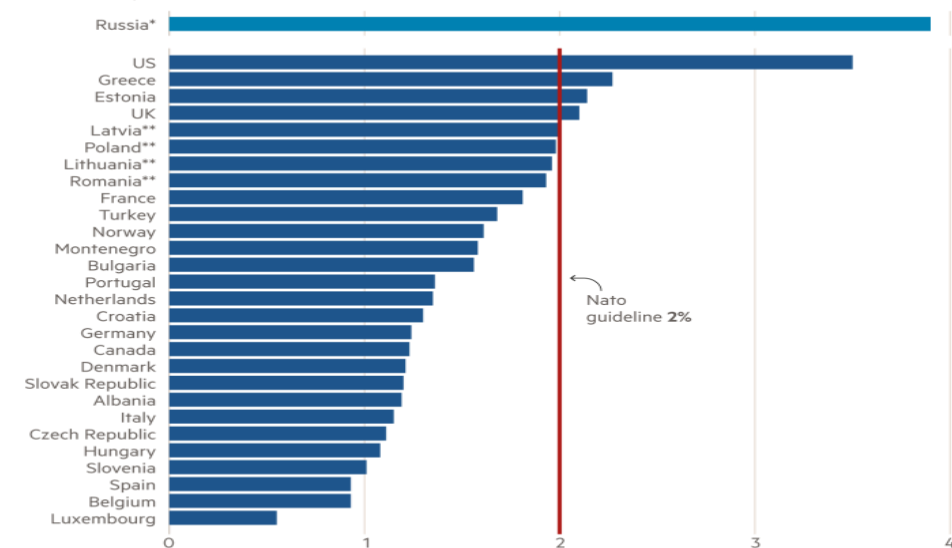
However, the main weakness of the 2% metric is that cost does not equal value. Depending on the proportion of a defense budget dedicated to salaries, benefits and pensions, the bulk of spending could go on personnel, and say little about combat power or readiness to deploy and fight away from home borders. Large but static armies may pass the test in terms of cost but would fail against numerically smaller forces equipped with superior information technology, faster vehicles and next-generation weapons. The emerging military potential of new technology (e.g. robotics, artificial intelligence) is re-directing attention on how much spending needs to be diverted towards military research and development.

In Figure 2 the list of NATO member states that have reached the 2% indicator in 2018 can be observed with just countries like US, Greece, Estonia and UK being over the requirement, while countries like Latvia, Poland, Lithuania and Romania almost reaching the 2% mark.

**Figure 2.** *Share of GDP, 2018.*

#### Defence expenditure

Share of GDP, 2018 estimates (%)



Iceland has no armed forces \* According to Nato definition \*\* Have either national laws or political agreements that call for at least 2% of GDP to be spent on defence annually, consequently these estimates are expected to change accordingly

Sources: Nato, IISS Military Balance

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**Source:** NATO, IISS Military Balance.

In order to test the hypothesis that expenditures on defense has a negative or positive impact on defense we have chosen to observe a larger group of countries, not just NATO countries, to try and see if the type of partnerships these countries share in terms of defense alliances would also share a role in affecting economic growth.

## **2. Partnerships and Alliances within NATO and the United States**

As mentioned in the previous chapter, in order to analyze the impact of defense expenditures on a larger number of variables in the model in chapter III we have selected different partnerships that the US and NATO has realized in terms of Defense.

The first group analyzed will be that of member states of NATO that have or have not increased their defense expenditures to 2%. In its current form, NATO has no less than 29 member states in its organization.

The second group studied will be that of The Istanbul Cooperation Initiative (ICI) which is an initiative launched during NATO's 2004 Istanbul summit.

During this summit, NATO leaders decided to elevate the Alliance's Mediterranean Dialogue to a genuine partnership and to launch the ICI with selected countries in the broader region of the Middle East. The initiative is an offer to engage in practical security cooperation activities with states throughout the Greater Middle East. This new initiative stands alongside NATO's Partnership for Peace Program and the Mediterranean Dialogue. NATO itself regards these security cooperation partnerships as a response to the new challenges of the 21st century and as a complement to the G8 and U.S.-EU decisions to support calls for reform from within the Broader Middle East region. The ICI comprises just 4 states: Bahrain, Qatar, Kuwait, and the United Arab Emirates

Another group is that of the Mediterranean Dialogue, first launched in 1994, is a forum of cooperation between NATO and seven countries of the Mediterranean. Its stated aim is to create good relations and better mutual understanding and confidence throughout the region, promoting regional security and stability and explaining NATO's policies and goals.

The Dialogue reflects NATO's view that security in Europe is tied to the security and stability in the Mediterranean. It also reinforces and complements the Euro-Mediterranean Partnership and the Organization for Security and Co-operation in Europe's Mediterranean Initiative.

The last group studied in the analysis is that of the Euro-Atlantic Partnership Council (EAPC), a post-Cold War NATO institution, is a multilateral forum created to improve relations between NATO and non-NATO countries in Europe and those parts of Asia on the European periphery. States meet to cooperate and go to the range of political and security issues. It was formed on May 29, 1997 in the ministers meeting of Sintra, Portugal, as the successor to the North Atlantic Cooperation Council (NACC), which was created in 1991. It works alongside the Partnership for Peace (PfP), created in 1994. It comprises 21 states, most of which are former communist countries that have joined the treaty after 1990, like Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kirgizstan, Moldova, Russia, Tajikistan,

Turkmenistan, Ukraine, Uzbekistan, former Yugoslavian Republics like Serbia, Bosnia and Hercegovina, as well as countries that are not part of NATO, but are European Union members like Sweden, Ireland, Finland, Malta and Austria.

### 3. Methodology and Variables

For the groups of countries chosen as samples for the models, we will use the *SIPRI Milex database* for defense expenditures data, SIPRI Trend Indicator for Export and Imports on armaments, as well as the World Bank data base regarding other variables such as unemployment and public debt. To have relevant data in our analysis we have grouped the countries into three groups: NATO Countries, NON-NATO Countries and Partnership for Peace Countries.

We have chosen these variables taking into consideration the fact that previous papers have shown that although usually defense expenditures have a negative impact on economic growth, a positive effect could still be observed in terms of the national defense industry of the countries studies. In terms of national defense industries two aspects must be taken into consideration. Employment is the first considered, as a functioning defense industry, be it through partnerships, off-set or just internal production would decrease unemployment and have a positive impact on economic growth. The second argument is that of imports and exports of armament that have increases since countries have been required not only to jump to 2% in terms of defense expenditures, but also to assure at least 20% of the budget to procurement of military equipment. For the following model we are going to use the following variables (Table 1):

**Table 1.** *Research variables*

Independent Variables	Dependent Variables
Unemployment	Exports of Armaments
Public Debt	Economic Growth
Defense expenditures as part of GDP	
Imports	
Exports	
Imports of armament	

**Source:** *Own study.*

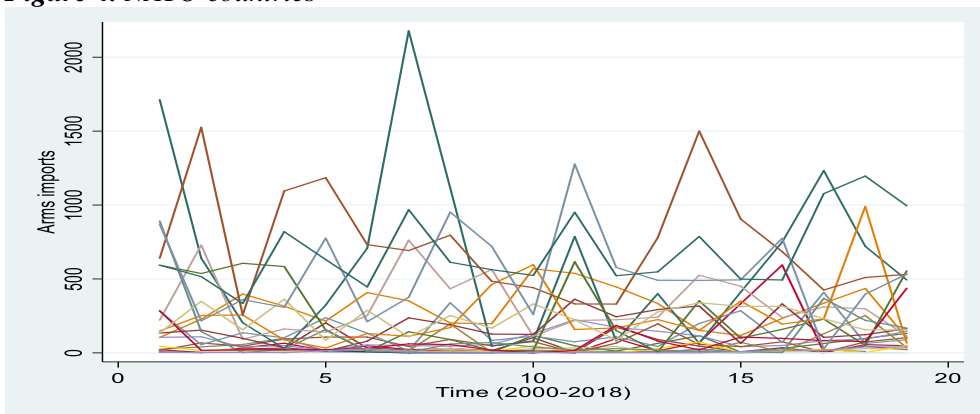
### 4. Testing and Results

For the following chapter we have tried to understand the impact that some economic indicators like exports, imports, economic growth, and unemployment have when correlated with exports of armaments. For model 1 we have chosen the exports of armaments as a dependent variable, because for NATO countries the increase of 2% in the GDP for Defense Expenditures has meant an increase in exports and imports of military equipment, starting with the year 2014. For Model 2 we have used economic

growth as our dependent variable, as it was the aim of the paper to identify the impact that defense expenditures and correlated indicators have on the GDP.

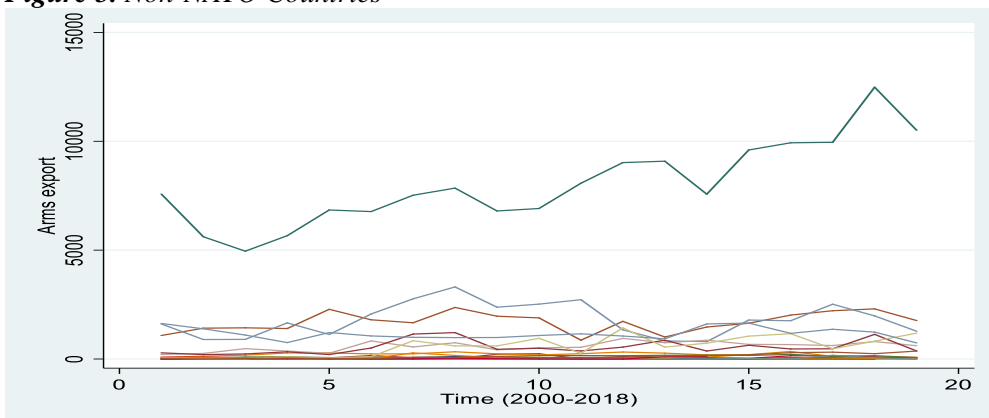
In the following graphs (Figures 4 and 5) the difference between NATO and Non-NATO countries can be seen in terms of their policies towards armaments imports. This is natural as the NATO countries are strictly following their commitment following the Wales Summit in 2014.

**Figure 4.** NATO countries



*Source:* Own study.

**Figure 5.** Non-NATO Countries



*Source:* Own study.

To examine the correlates of arms exports in our group of countries, the Feasible Generalized Least Squares (FGLS) estimator is used. This method estimates the structure of heteroskedasticity from the Ordinary Least Square (OLS), and also allows designing a consistent estimator of the errors' covariance matrix based on residuals. Even though it is not always consistent, the FGLS is preferred over OLS under heteroskedasticity and autocorrelation, especially when dealing with large samples.

In Table 2 below, we use a simple FGLS model to explain the impact of several potential explanatory variables on arms exports. Different models (Models 1-3) are separately built for three distinct groups of countries. According to the models' estimates, higher arms imports are positively correlated to higher arms exports and to a lower public debt. The total exports and imports carry different effects across the NATO and non-NATO countries. For instance, higher imports are associated to higher arms exports in the Non-NATO countries, and to lower arms exports in the NATO countries. In turn, the total exports could be a determinant of arms exports only in the NATO countries (which also reflect in Model 1 which includes all countries).

**Table 2.** *Correlates of arms exports*

Explanatory variables	All countries (Model 1)	NATO countries (Model 2)	Non-NATO countries (including PfP) (Model 3)
Arms imports	0.69*** (0.22)	0.63*** (0.18)	1.45*** (0.47)
Total exports	0.0035*** (0.0002)	0.0043*** (0.0001)	0.00005 (0.001)
Total imports	0.0003 (0.0003)	-0.0005** (0.0002)	0.0084*** (0.0011)
Public debt	-13.97*** (1.95)	-5.07*** (1.7)	-15.65*** (3.87)

**Note:** Cross-sectional time-series FGLS regression, 167 observations.

**Source:** Own study.

In Table 3, the same models as in Table 2 are run, but this time by considering the heteroskedasticity (Models 1H-3H). The estimates are much lower than in Table 2, but in general lines they reflect the same empirical findings.

**Table 3.** *Correlates of arms exports, under heteroskedasticity*

Explanatory variables	All countries (Model 1H)	NATO countries (Model 2H)	Non-NATO countries(including PfP) (Model 3H)
Arms imports	0.24*** (0.09)	0.21* (0.10)	0.57*** (0.20)
Total exports	0.0025*** (0.0002)	0.0029*** (0.0002)	0.0003 (0.007)
Total imports	0.0001 (0.0002)	0.0001 (0.0002)	0.0022*** (0.0008)
Public debt	-6.46*** (0.68)	-5.11*** (1.15)	-5.40*** (1.60)

**Note:** Cross-sectional time-series FGLS regression, with correction for heteroskedasticity 167 observations.

**Source:** Own study.

To sum up the findings derived from Table 2 and Table 3 a higher public debt is strongly and significantly associated to a lower amount of arms exports, while higher arms imports tend to be associated to higher arms exports. Given that in the empirical section we operate with a restrained number of variables, before to run the quantitative analysis, we briefly discuss the correlations between our variables, upon different groups of countries.



First, when comparatively examining the NATO and non-NATO groups of countries, we notice a much higher correlation among all variables for the NATO countries, and much lower and even negative correlations between the non-NATO countries. This is according to our expectations and it suggests the common policy framework implemented at the level of NATO countries. The testing of correlation for model 1 can be observed in Table 4:

**Table 4.** *Correlation coefficients, NATO countries Correlations coefficients, Non-NATO countries*

	ARMS EXPORTS	TOTAL EXPORTS	ARMS IMPORTS	TOTAL IMPORTS	PUBLIC DEBT
<b>ARMS EXPORTS</b>	1				
<b>TOTAL EXPORTS</b>	0.91	1			
<b>ARMS IMPORTS</b>	0.43	0.38	1		
<b>TOTAL IMPORTS</b>	0.71	0.83	0.23	1	
<b>PUBLIC DEBT</b>	0.19	0.29	0.21	0.35	1

*Source:* Own study.

According to the models' estimates, higher GDP is positively associated to higher defense expenditures, higher arms exports and total exports, and there is no significant correlation to the public debt. The arms exports carry different effects across the NATO, non-NATO and PfP countries. (No reference above???) For instance, higher defense expenditures are associated to higher arms exports in NATO and non-NATO countries in general, but not in the case of PfP countries. Total exports have a positive correlation with the defense expenditures for all the countries analyzed (Table 5):

**Table 5.** *Correlates of GDP*

<b>Explanatory variables</b>	<b>All countries (Model 1)</b>	<b>NATO countries (model 2)</b>	<b>Non-NATO countries (without PfP) (Model 3)</b>	<b>PfP countries (Model 4)</b>
Defense expenditures	14.25*** (0.30)	10.20*** (0.49)	11.63*** (1.27)	16.64*** (1.72)
Arms exports	101.39*** (15.92)	625.21*** (49.33)	45.01*** (9.36)	16.09*(11.53)
Total exports	2.83*** (0.09)	1.89*** (0.14)	2.86*** (0.094)	2.71*** (0.11)
Public debt	365.30* (652.43)	967.10* (869.99)	-452.81* (271.81)	-122.18*(418.64)

*Note:* Cross-sectional time-series FGLS regression, 167 observations

*Source:* Own study.

In Table 6, the explanatory variables analyzed were defense expenditures, arms imports, total imports and public debt.

**Table 6. Correlates of GDP**

<b>Explanatory variables</b>	<b>NATO countries</b>	<b>Non-NATO countries</b>	<b>PfP countries</b>
Defense expenditures	20.33*** (0.79)	24.66*** (1.29)	33.95*** (2.06)
Arms imports	417.05* (159.74)	-46.00** (23.12)	-17.71* (150.83)
Public debt	3059.13* (1734.24)	148.38* (252.90)	632.15* (737.31)

**Note:** Cross-sectional time-series FGLS regression with a correction for heteroskedasticity, 167 observations

**Source:** Own study.

According to the models estimates, higher GDP is overall positively associated to higher defense expenditures across all countries analyzed, while higher defense expenditures do not have a significant correlation to higher arms imports for the NATO countries. For the Non-NATO outside of PfP and PfP member countries, higher defense expenditures have a negative association to arms imports. Public debt does not appear to have an association to higher defense expenditures nor arms imports, in any of the countries analyzed.

Given that in the empirical section we operate with a restrained number of variables, before to run the quantitative analysis, we briefly discuss the correlations between our variables, upon different groups of countries.

To sum up the findings derived from Table 1 and Table 2, higher defense expenditures are not significantly associated to higher public debt in the countries analyzed. Considering that many of the NATO members are also members of the EU and have to comply with public debt limits set in the Maastricht Treaty, the findings are consistent with the measures taken by these countries to keep the public debt under control. Higher defense expenditures because of NATO requests do not have an influence on this indicator for NATO countries. The non-NATO countries do not have to comply with the 2% of GDP for defense expenditures mark, so their defense expenditures do not show a correlation with the public debt.

The correlation between higher defense expenditures and higher arms imports in NATO countries is not a significant one, and it appears that for the time analyzed higher defense expenditures have not materialized in higher arms imports. The findings are not surprising, considering that, although the 2% of GDP mark has been in place in NATO for many years, there were no incentives or coercive measures to increase the defense expenditures. The situation has changed only starting with 2015, as new threats have emerged for the NATO countries. When comparatively examining the NATO and non-NATO groups of countries, we notice a much higher correlation among all variables for the NATO countries, and much lower and even negative correlations between the non-NATO countries. This is according to our expectations and it suggests the common policy framework implemented at the level of NATO countries.

## 5. Conclusions

The correlation between higher defense expenditures and higher arms imports in NATO countries is not a significant one, and it appears that for the time period analyzed higher defense expenditures have not materialized in higher arms imports. The findings are not surprising, considering that, although the 2% of GDP mark has been in place in NATO for many years, there were no incentives or coercive measures to increase the defense expenditures. The situation has changed only starting with 2015, as new threats have emerged for the NATO countries and following the policy of Donald Trump to pressure the European NATO members to increase their defense expenditures.

The real issue is what an “adequate” amount of military spending really is, given that every extra dollar spent above the necessary level is a clear loss for the economy. This principle comes from the so-called *Guns and Butter Effect*, whereby analyzing marginally it is evident that for every increase in defense expenditures, other expenditures in the public sector will be affected. In a democracy, this issues of the *Guns and Butter Effect* is debated by publicly elected officials and changes year to year. For example, military spending in the US has been declining as military engagements abroad wrap up. In non-democratic nations, however, the level of adequate spending is decided by a select few and may come at even a greater cost to the country’s citizens.

## References:

- Amjad, A., Muhamed, A. 2014. Impact of Defense Expenditure on Economic Growth: Time Series, Evidence from Pakistan. *Global Journal of Management and Business Research: Economics and Commerce*, 14, 9, Version 1.0.
- Dumitrache, V. 2019. The Difference between Allocation and Expenditures inside the PPBEES Model, *Regional Department of Defense Resources Management Studies, Conference Book*, 85-91.
- Gheorghe, S. 2019. The Role of the EU and NATO in Providing European Defense and Security. *Complementarity or Competition, Regional Department of Defense Resources Management Studies, Conference Book*, 231-244.
- Heo, U. 2010. The Relationship between Defense Spending and Economic Growth in the United States, *Political Research Quarterly*, Vol. 63, No. 4, 760-770.
- Korkmaz, S. 2015. The Effect of Military Spending on Economic Growth and Unemployment in Mediterranean Countries, *International Journal of Economics and Financial Issues*, Vol. 5, No. 1, 273-280.
- North-Atlantic Treaty Organization. 2018. The International Institute for Strategic Studies. *The Military Balance 2018, Chapter Two, Comparative Defense Statistics*, 19-26.
- Obreja, L. 2010. The Impact of Defense Expenditure on Economic Growth. *Journal*

- for Economic Forecasting, Institute for Economic Forecasting, vol. 0(4), 148-167.
- Robert, W., Alexander, J. 2007. The impact of defense spending on economic Growth. *Journal of Defense Economics*, Vol 2, 39-55.
- Strambeanu, L. 2019. Enhancing National Defense Planning, Regional Department of Defense Resources Management Studies, Conference Book, 252-259.
- Data World Bank indicators, 1960-2018.